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AIR MONITORING AND CONTINGENCY PLAN
N-FORCER ASBESTOS SITE
DEARBORN, MICHIGAN

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1.0 INTRODUCTION

1.1 Background

A large deposit of vermiculite was discovered on Zonolite Mountain in the Rainy Creek Mining District of Lincoln County, Montana, in 1916 by E.N. Alley. Alley formed the Zonolite Company and began commercial production of vermiculite in 1921. Another company, the Vermiculite and Asbestos Company (later known as the Universal Insulation Company), operated on the same deposits. W.R. Grace purchased the mining operations in 1963 and greatly increased production of vermiculite until 1990 when mining and milling of vermiculite ceased. (Wies 2001)

Asbestos contaminated material from the Libby mine was transported to vermiculite exfoliation facilities throughout the country. Although the mine has ceased operations, concern exists that continuing releases of asbestos from mine-related materials could be a risk to current and future residents in the areas of these plants (Wies 2001). Residual fiber contamination from the subject facilities continues to present potential exposure to workers, residents, and visitors at these facilities. The U.S. Environmental Protection Agency (EPA) is in the process of evaluating and cleaning up these sites. Prior to any remedial action EPA requires that an Air Monitoring and Contingency Plan (AMCP) be developed for each site. The Agency for Toxic Substances and Disease Registry (ATSDR) is currently developing Health Evaluations for each of the Exfoliation Plant sites throughout the country. The site specific Health Evaluation should be consulted in conjunction with this AMCP.

1.2 Purpose

The purpose of this plan is to protect the health and safety of equipment operators, other onsite workers, and the surrounding community through the use of real-time monitoring, as well as, time-integrated and short-term analytical sample collection to identify airborne concentrations of asbestos and to quantify potential emissions during a Removal/Remedial Action. Airborne asbestos concentrations will be monitored and sampled at background location(s), within the immediate work zone, and at the Site perimeter. This AMCP shall remain in effect during all excavation and waste handling activities and will also address the engineering controls for mitigating airborne exposures in the event that action is necessary.

1.3 Scope

The N-Forcer AMCP specifies air monitoring requirements (i.e., locations, frequencies, and parameters) for all aspects of the N-Forcer Removal/Remedial Action. The AMPC provides for the protection of both on-site workers and off-site areas. This AMCP will specify the minimum requirements for real-time, personnel, and residential monitoring. Specific monitoring requirements (instrumentation, calibration, and action levels) shall be included in the site specific Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP.) The AMPC contains sufficient details to address sample collection, management, and analysis.

2.0 OVERVIEW OF REMOVAL/REMEDIAL ACTION

The N-Forcer project involves the excavation, containerization, transportation and disposal of asbestos contaminated soil at commercial and residential properties in the Dearborn, Michigan area.

3.0 APPROACH

The AMCP portion of the project will be broken down as follows:

- Real-time air monitoring on-site
- Perimeter real-time air monitoring to determine potential off-site migration
- Air sampling for asbestos on-site
- Perimeter/residential asbestos air sampling to determine potential off-site migration

3.1 Decision Frame work

All on-site removal work will be performed in Level C. No direct reading real-time monitoring instruments exist for asbestos. Therefore all health and mitigation decisions need to be based on air sampling with rapid analytical (24-hour) turn around time. Real-time air monitoring for particulates will be performed to gauge the effectiveness of the on-site dust suppression program. Additionally, particulate monitoring data may be used to be correlated with collocated asbestos results. On-site worker exposure and off-site/perimeter data will be compared with the Occupational Safety and Health Administration (OSHA) Permissible Exposure Level (PEL) of 0.1 fibers per cubic centimeter (f/cc). Both on-site and off-site sampling data will be used as a gauge to monitor the effectiveness of the dust suppression activities.

3.2 Hazard of the Contaminant

Vermiculite ore bodies from Libby, MT contain amphibole asbestos at concentrations ranging up to nearly 100% in selected areas. During early vermiculite mining operations, airborne concentrations of asbestos fibers at the mine exceeded 100 fibers per cubic centimeter (f/cc) in several job classifications. Historical airborne fiber concentrations in the residential area of Libby also exceeded the present occupational PEL of 0.1 f/cc established by Occupational Safety and Health Administration (OSHA) in 1994 (Wies 2001).

4.0 SAMPLING NETWORK

Air sampling locations will be contingent upon site specific conditions, and may vary from day to day based on meteorological conditions. Short term (1 to 2 weeks) monitoring events cannot rely on climatological data for location placement. These events will require the use of an on-site meteorological tower and/or a daily local weather forecast. Long term monitoring events may be able to utilize monthly, seasonal, or annual climatological data for monitor placement. Sample locations may be upwind one day and downwind the next.

General considerations that should be taken into account include: vertical placement above the ground, horizontal spacing from nearby obstructions, unrestricted air flow, and distance from

roads. (USEPA 1990). Sampling locations should also take into account the effects of local topography on day/night wind shifts (i.e. sea/land breeze, valley/mountain breeze). Also consider the potential impact from upwind or background sources. (USEPA 1995)

4.1 On-site Monitoring

On-site dust monitoring shall be performed for comparison with established action levels to determine the need for additional suppression measures or work stoppage. Wind speed thresholds for work stoppage shall also be monitored.

4.2 On-site Sampling

4.2.1 Workers

It is the responsibility of each individual removal/remedial contractor to provide personnel sampling for its employees. Sampling should be performed on employees in major functional groups (i.e. track hoe operators, back hoe operators, grader operators, truck drivers, etc.). This sampling may be performed with low volume sampling pumps placed on the individual employees within their breathing zone.

4.2.2 Area Sampling

On-site area sampling will be performed in areas assumed to be free of asbestos contamination. Samples will be collected in areas normally considered to be Level D areas, such as the clean end of the decontamination line and on-site offices. These areas will also be sampled during background events. Sampling will be performed with a medium range sampler at flow rates of approximately 10 liters per minute (LPM).

4.3 Off-site Sampling

4.3.1 Perimeter/Fence Line Sampling

Perimeter/fence line sampling will be performed to gauge the effectiveness of the on-site dust control program. Considerations to take into account include areas near suspected high contamination, accessibility, security, representativeness, and access to AC power. Sampling will be performed with a medium range sampler at flow rates of approximately 10 LPM.

4.3.2 Residential Sampling

As an added measure of safety, a residential sampling program may need to be instituted. Locations to be considered shall include the nearest resident, climatologically downwind residents, and sensitive receptors. Sensitive receptors should include daycare centers, schools, parks, hospitals, areas near suspected high contamination. Site perimeter reconnaissance may reveal additional local concerns. Sampling may be performed with a medium range sampler at flow rates of approximately 10 LPM. The requirement for residential sampling will be determined once properties requiring removal of asbestos contaminated soil have been identified.

4.3.3 Air sampling Plan

Eighteen sampling locations (Figure #1) have been identified for the vermiculite exfoliation facility portion of the N-Forcer site. These typically include two upwind and three to four downwind excavation perimeter samples. Sampling locations include two samples on the soccer field, and one at the site office trailer.

The exfoliation facility portion of the N-Forcer site will be divided into 3 removal units (1, 2, 3 in Figure #1) and two upwind and up to four down wind samples will be deployed per removal unit. It is anticipated that only one removal unit will be active per day. The Work Assignment Manager or representative shall determine the number of downwind samples based on weather forecasts and removal unit dimensions using professional judgment.

4.4 Background Sampling

Prior to and at the conclusion of onsite removal/remedial activities background sampling will be performed. Representative locations that will be monitored during removal activities will be sampled. This will include on-site area locations and perimeter/fence line locations. Representative off-site sampling locations will also be sampled as part of the background monitoring effort. Sampling will be performed with a medium range sampler at flow rates of approximately 10 LPM.

Background/Baseline samples will be collected at Stations A1, A3, A5, A7, A9, A11, A12, A13, A14, A15, A16, A17, and A18 (Figure 1). This comprises 13 locations, to include all of the "upwind locations", two samples on the soccer field, one at the office trailer, and all of the odd numbered excavation perimeter locations.

5.0 FREQUENCY OF MONITORING AND SAMPLING

5.1 Frequency of On-site Monitoring

Perimeter/fence line and on-site particulate monitoring (DataRam, section 6.1) will be conducted prior to the initiation of any on-site intrusive activities that would be expected to cause soil disturbance. The number of days and monitoring locations shall be of such duration as to present a statistically valid background particulate concentration; two days of monitoring will be conducted at the N-Forcer Site. Excavation perimeter/fence line and on-site particulate monitoring will be conducted daily throughout the project when excavation is occurring, in order to determine the effectiveness of the on-site dust suppression program. Proper care will be taken to prevent interference from site wetting activities.

5.2 Frequency of Air Sampling

Prior to commencing soil excavation, air sampling for asbestos will be conducted at the excavation perimeter/fence line, as well as at selected off-site locations. The number of days and sampling locations will be of such duration as to present a statistically valid background asbestos

concentration (if any); two days of sampling will be conducted at the N-Forcer Site prior to beginning any intrusive activities. Air sampling for asbestos (on-site area, excavation perimeter/fence line, and residential) will be conducted daily during site operations (excavation). In order to produce a complete data set and to establish the effectiveness of the dust suppression program it is advisable to conduct air sampling for asbestos every day of site activities. However, if during the remedial/removal activities no concentrations are above the on-site and off-site action levels for 10 days, sampling frequency may be re-evaluated.

6.0 METHODOLOGIES AND ACTION LEVELS

6.1 Air Monitoring for Particulates Methodology

Particulates shall be monitored either by utilizing the Thermo MIE DataRam Real-time Aerosol Monitor or an instrument with an equivalent range and sensitivity. The DataRam is a high sensitivity nephelometric monitor whose light scattering sensing configuration is optimized for the measurement of the concentration of airborne dust, smoke, fumes, and mists in ambient environments. The instrument samples the air at a constant flow rate by means of a diaphragm pump and passes the sampled air through the optical sensing stage. The DataRam covers a range of measurement from 0.1 micrograms per cubic meter ($\mu g/m^3$) to 400 milligrams per cubic meter (mg/m^3) with monitoring information being logged internally.

6.2 Air Sampling for Asbestos

Air samples will be analyzed using the National Institute of Occupational Safety and Health Method 7400 Asbestos and other Fibers by PCM. Samples will be archived for ISO Method 10312, *Ambient Air- Determination of Asbestos Fibers: Direct Transfer Transmission Electron Microscopy Method* should additional information be required. It is anticipated that air samples will be analyzed by ISO 10312 at a rate of between 10 and 20 percent of the PCM analysis. The Transmission Electron Microscopy (TEM) analysis will be used to confirm or refute the presence of asbestos as well as to speciate the asbestos fibers and ascertain their mineralogy.

6.2.1 Personnel Sampling

Personnel sampling for asbestos will be conducted using modified Environmental Response Team (ERT) Standard Operating Procedure (SOP) #2015, *Asbestos Sampling.* This method will be used to establish baseline, or undisturbed conditions, as well as, during the site remedial/removal activities. For all asbestos sampling, an asbestos sampling train consisting of 0.45 or 0.8-micron (μm), 25-millimeter (mm) mixed cellulose ester (MCE) filter connected to a sampling pump will be used. The top cover from the cowl extension on the sampling cassette shall be removed ("open-face") and the cassette oriented face down. A personal sampling pump will be calibrated to collect approximately 1 liters per minute (L/min) for the 8 hour time integrated samples or 4 L/min for the 30 minute short-term exposure measurements. The flow rate will allow a target volume of 480 liters (L) and 120 L and provide a sensitivity limit of less than or equal to ***0.001 f/cc***. Both the 8-hour time weighted average and 30-minute short-term exposures shall be documented for on-site workers.

6.2.2 Area, Perimeter/Fence Line, and Residential Sampling

On-site area, excavation perimeter/fence line, and residential air sampling for asbestos will be conducted using ERT SOP #2015, *Asbestos Sampling.* This method will be used to establish baseline, or undisturbed conditions, as well as, during the site remedial/removal activities. For all asbestos sampling locations, an asbestos sampling train consisting of 0.45 or 0.8 μm, 25-mm MCE filter connected to a sampling pump will be used. The top cover from the cowl extension on the sampling cassette shall be removed ("open-face") and the cassette oriented face. An Aircon II or equivalent sampling pump will be calibrated to collect approximately 10 L/min of air through the filter. The flow rate will allow a target volume of 4200 L and provide a sensitivity limit of less than or equal to 0.0005 f/cc.

6.3 Action Levels

6.3.1 Particulate Action Levels

There are no real-time monitoring instruments available for measuring airborne concentrations of asbestos. Therefore, airborne particulate levels will be employed as a surrogate as an indication of effectiveness of dust suppression techniques. The OSHA PEL for respirable nuisance dust is 5 milligrams per cubic meter (mg/m^3). If that dust contains a silica fraction the PEL could be driven down lower based on the percentage of silica. In 2004 the American Conference of Government Industrial Hygienists (ACGIH) recommended a respirable dust Threshold Limit Value (TLV) of 3 mg/m^3. The on-site particulate action level shall be **5 times** its derived background concentration not to exceed 5 mg/m^3. The perimeter/fence line particulate action level shall be **2 times** its derived background concentration not to exceed 1.5 mg/m^3 ($^1/_2$ ACGIH TLV). Should either of these concentrations be exceeded, dust suppression methods must be employed. If dust suppression methods are currently in progress while the action level is exceeded, these methods may need to be expanded and/or re-evaluated.

6.3.2 Asbestos Air Sampling Action Level

The OSHA PEL for asbestos is 0.1 fibers per cubic centimeter (f/cc). The on-site area sampling action level is **0.1 f/cc for an 8 hour time weighted average**. The perimeter/fence line and residential action level is ***0.05 f/cc* for an 8 hour time weighted average (1/2 the PEL)**. If either of these concentrations are exceeded dust suppression methods must be employed. If dust suppression methods are currently in progress while the action level is exceeded, these methods shall be expanded and/or re-evaluated.

6.3.2.1 EXPOSURE PARAMETERS Used to Calculate Risk from Project

The exposure parameters used to calculate the short-term level of concern for workers and nearby residents are summarized below. These values were obtained from the General Work and Monitoring Plan for Libby Building Demolitions April 2005. However, since these risk based levels exceed the OSHA PEL, the action levels revert back to the PEL or a fraction there of.

Age at Exposure

Risk from asbestos exposure is higher for exposures that occur early in life than for those that occur later in life. Therefore, in order to be maximally conservative, it is assumed that the maximally at-risk resident is a child aged 1 year during exposure. For a demolition worker, it is assumed that the youngest worker is age 18.

Exposure Duration

The duration of the excavation is likely to vary from location to location. A value of 5 days has been selected for use in these calculations. It is anticipated that most excavation projects will be completed in less than 5 days.

Breathing Rate

In accord with standard EPA guidelines, workers are assumed to inhale 10 m^3 of air per 8-hour work day. USEPA has not identified a national default breathing rate for residential children, but USEPA Region 3 uses a value of 12 m^3 per 24-hour day for the calculation of risk-based concentrations of chemical in water and air, and that value is selected for use in this project.

Maximum Allowable Lifetime Excess Cancer Risk

The maximum allowable excess lifetime cancer risk associated with the excavation of asbestos contaminated soil is a matter of risk management judgment. For the purposes of this calculation, a value of 1E-04 was used for residents, which is the upper end of EPA's usual acceptable risk range. For workers, a value of 1E-05 was used, to account for the possibility that the same workers might be involved in the excavation of multiple sub-sites.

RISK ESTIMATE RESULTS

Based on these exposure assumptions, the short-term concentration levels of asbestos in air that are of potential human health concern were calculated. Results based on the Integrated Risk Information System (IRIS) model are expressed in units of PCME s/cc, and the results from the Berman-Crump (EPA 2003) model are expressed in units of Berman-Crump (BC) s/cc. A PCME structures is ≥5 um in length, ≥0.25 um in thickness, and has an aspect ratio ≥3:1. Berman Crump structures are ≥10 um in length and ≤0.4 um in thickness. The resulting risk-based values for short-term exposure to air are presented below:

Short-Term (5-Day) Level of Concern (s/cc) Using Risk-Based Particles Sizes

Population	IRIS	Berman-Crump 2003 (BC s/cc)	
	(PCME s/cc)	Libby Amphiboles (LA)	Chrysotile
Workers	1.09	0.36	1.82
Residents	27.2	9.08	45.4

Particle size distribution data for air samples collected at the Libby Montana Site, the source of the N-forcer vermiculite, indicate that approximately 43% of all TEM structures in air are PCME structures, and that approximately 4.1% of all TEM structures in air are Berman-Crump protocol structures (USEPA 2005). Based on these ratios, it is possible to estimate the risk based concentrations presented above, expressed in units of total ISO s/cc, as follows:

Short-Term Level of Concern (s/cc) Using Total ISO Structures

Population	IRIS (ISO s/cc)	Berman-Crump 2003 (ISO s/cc)	
		LA	Chrysotile
Workers	2.5	8.9	44
Residents	63	220	1100

It is apparent that the airborne levels of ISO structures calculated in this way are very high. This is because the assumed exposures are very brief (8 hr/day, 5days per lifetime). Such exposure levels would not be acceptable if exposure frequency or duration were higher.

Since the short term risk values calculated exceed the OSHA PEL, the site asbestos action level will revert to the PEL or regulatory limit and the site perimeter action level shall be set at ½ the PEL.

7.0 AIRBORNE EXPOSURE MITIGATION METHODS

To ensure dust suppression the following actions should be taken:

- During demolition, the project supervisor will carefully watch for evidence of visible dust moving to off-site locations. If this occurs, demolition activities will be halted until application of water to the soil reduces levels to an acceptable amount.
- Should sustained wind speeds exceed 10 mph work shall be halted
- Limit on-site vehicle speed to less than 10 miles per hour
- Ensure that sufficient water is applied to the area prior to disturbance to prevent visible emissions from crossing project boundaries
- Keep areas to be graded or excavated adequately wetted to prevent visible emissions from crossing project boundaries
- Keep storage piles adequately wetted, treated with chemical dust suppressant, or covered when material is not being added or removed
- Stabilize storage piles when inactive for more than 7 days by adequately wetting, establishing surface crusting, applying chemical dust suppressant, covering with tarps or vegetative cover, installing wind barriers around three sides of open areas, or other measure as effective.

- Wash down equipment before moving from property onto paved roadway

- Install track-out prevention device (gravel pad, tire shaker, wheel wash system), 50 feet of pavement extending from intersection with paved public road, or other measure as effective

- Clean up visible track-out on paved public road using wet sweeping or HEPA filter equipped vacuum device by end of work shift.

- Stabilize disturbed surfaces using vegetative cover, 3" of non-asbestos-containing material, paving, or other measure deemed sufficient to prevent 10 mph winds from causing visible emissions

Wind Speed Work Stoppage

The application of a wind speed work stoppage requirement is designed to control fugitive emissions due to increased air velocity. In the event of high wind speeds, work will be stopped at the site until wind speeds are reduced to a speed that will not generate visible emissions from the site. The Michigan State solid waste regulations indicate that wind speeds which will trigger work stoppage requirements are between 20 and 25 miles per hour (MDEQ 2005). For the purposes of this site, work will be stopped when wind speeds reach a sustained 10 miles per hour, or any wind speed at which particulates are observed by site personnel to be entrained in the air stream. If site-specific weather creates conditions that may result in fugitive emissions, work stoppage may occur at wind speeds less than specified above based on decisions of site personnel.

The OSC will make the decision as to when it is appropriate to restart.

Street Cleaning and Maintenance of Roadways

Streets and roadways will be cleaned by equipment that will produce no visible emissions of dust, if practicable. Mud and dirt carry-out onto paved surfaces will be prevented (e.g., using gravel entry ways, washing vehicle wheels, etc.). Any mud and dirt carry-out onto paved surfaces will be wetted and cleaned-up daily. All unpaved roads and other disturbed surfaces on the site will be watered as necessary to prevent off-site transport of visible fugitive particulate emissions.

Wetting/Dust Suppression

Two basic general area water application methods will be employed. The first method is applying water from a tank truck. The second method is applying water directly from a fire hydrant or hose. These two methods will assure proper distribution of wetting agents during application. The anticipated schedule for the application of wetting agents and water to the soil will be determined by environmental and site conditions. If a precipitation event occurs, site

management personnel may adjust the application schedule of wetting agents and water. Any modifications, and the necessary justification for the modification, will be recorded in a project logbook maintained by the Remediation Contractor.

Wetting of all work areas, where active soil disturbance will occur that day, will begin prior to the start of the disturbance activities. Wetting will be conducted as appropriate, based on the visual observations of the site construction manager.

Maintenance wetting will occur at the close of each workday in preparation of the following day's work zones. If maintenance wetting from the previous workday appears adequate (i.e., preliminary movement of machinery to a work zone will not yield emissions), and passes inspection, additional initial wetting will not be required, as determined by the site construction manager using a shovel to dig a series of small holes and visually ensuring the penetration is adequate. Adequate wetting shall occur to prevent the possible emission of material during the movement of equipment to another location. Care will be taken to assure that the application of water does not produce emissions from the ground surface and that there is not excessive over-watering. Wetting will occur immediately prior to each soil disturbance activity. This wetting is to assure that the surface conditions remain adequately wet between the initial wetting period and the actual soil disturbance. This wetting activity will occur immediately prior to the removal of each lift, as necessary, dependent upon infiltration/penetration rate and depth from the previous application.

During the actual soil disturbance activity, water will be applied to the site of the disturbance, as appropriate, to suppress any visible emission. In general, personnel tasked with wetting duties will be assigned to each soil disturbance area to complete this wetting activity. Wetting crews will be comprised of one to three persons with either a water truck equipped with a hose and diffuser nozzle or a hose and diffuser nozzle directly from a fire hydrant or water source.

The site construction manager will oversee the wetting of work zones to assure that sufficient wetting is occurring. Additional moisture will be misted over the work areas as the excavation progresses, and as necessary to suppress visible emissions. Should oversight personnel discover that visible emissions are being generated by the excavation activities, personnel will be instructed to use additional wetting at that location.

8.0 METEOROLOGICAL MONITORING

To document local area wind flow (upwind, downwind, and background) conditions meteorological monitoring must be performed. A meteorological monitoring station will be set up in a location representative of the area where on-site activities will be performed. A tower will be erected to monitor wind speed, wind direction, barometric pressure, temperature, solar radiation, and rainfall. All meteorological parameters will be situated and measured in accordance with the "Quality Assurance Handbook for Air Pollution Measurement Systems" Volume IV: Meteorological Measurements (March, 1995).

For short-term duration projects, such as this, a portable 3-meter meteorological tower will be deemed acceptable. In order to maintain valid measurement data, meteorological sensors are

required to be field calibrated every six months. Some portable towers are only required to be calibrated annually.

9.0 DATA QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT OF DATA

The purpose of the air sampling for asbestos is to produce data that are, as reasonably possible, an accurate representation of the current levels of airborne asbestos fibers which may be released during typical site activities. These data may be used for a variety of purposes, including the development of human health risk assessment and the evaluation of the adequacy of current measures that have been implemented to protect the public from excessive asbestos exposures.

Asbestos contaminated material from the Libby mine was transported to the N-Forcer vermiculite exfoliation facility. Therefore, there is a need to determine whether this site could result in an inhalation exposure that poses a health hazard for individuals in the vicinity of the site.

Sampling activities will be conducted before, during, and after onsite soil disturbance activities.

The detection limits (DLs) for perimeter air sampling for asbestos will be 0.001 fibers per cubic centimeter (f/cc) by PCM and 0.0005 f/cc by TEM. Lower DLs will be achieved by adjusting the flow rates to obtain maximum loading.

Two of the three data categories (DCs) based on the two Superfund Data Categories described in the 1993 Office of Solid Waste and Emergency Response (OSWER) Office of Emergency and Remedial Response (OERR) Doctrine will be used for this WA.

Screening data is typically used to evaluate the ambient air within the breathing zone for particulates. Screening data without definitive confirmation is not considered to be "data of known quality." The following requirements for "Screening Data" are applicable:

- Sample documentation in the form of field logbooks and appropriate field data sheets. Chain of custody records are optional for field screening locations.

- All instrument calibration and/or performance check procedures/methods will be summarized and documented in the field/personal or instrument log notebook. The manufacturer's instructions or SOPs should specify the procedure and frequency for calibration during use.

- Detection limit(s) will be determined and documented, along with the data, where appropriate.

Definitive data is used for all data collection activities that require a high level of accuracy using EPA, National Institute of Occupational Safety and Health (NIOSH), American Society for Testing and Materials (ASTM), and other industry-recognized methods. For the data to be

definitive, either total measurement error or analytical error must be determined. The following requirements for "Definitive Data" are applicable:

- Sample documentation in the form of field logbooks, the appropriate field data sheets, and chain of custody forms will be provided.
- All instrument calibration and/or performance check procedures/methods will be summarized and documented in the field/personal or instrument log notebook.
- Detection limit(s) will be determined and documented, along with the data, where appropriate.
- Sample holding times will be documented; this includes documentation of sample collection and analysis dates.
- Initial and continuing instrument calibration data will be provided.
- For air samples, field blanks will be included for each day sampling is performed for each analysis. Lot blanks will be included for each lot of sample media used for each analysis.
- Performance Evaluation (PE) samples are optional.
- Analyte identification will be confirmed on 100% of the samples by analytical methods associated with definitive data.
- Quantitation results for all samples will be provided.
- Analytical or total measurement error must be determined on 100% of the samples.
- Analytical error determination measures the precision of the analytical method.
- At a minimum, two media blanks, prepared and analyzed in accordance with the method, calculated and compared to method-specific performance criteria.
- Total measurement error is determined from independently collected samples from the same location and analyzed by analytical methods associated with definitive data. Quality control parameters such as the mean, variance, and coefficient of variation is calculated and compared to established measurement criteria.

The number of samples to be collected for this project is presented in Table 1, *Field Sampling Summary - Air*, and Table 2, QA/QC *Analysis and Data Categories Summary - Air.* These tables identify analytical parameters desired; type, volume and number of containers needed; preservation requirements; number of samples to be collected; and associated number and type of QC samples based on the data category.

10.0 DOCUMENTATION

Documents and records that may be generated during this project include:

- HASP
- QAPP
- Laboratory, site log books
- Site map
- Sample labels
- Chain of Custody (COC) forms
- Custody Seals
- Air Sampling Work Sheets
- Instrument printouts
- Data reduction records
- Data assessment forms
- Final Trip Report
- Laboratory analytical reports
- Data Validation Records

A Final Report will provide a description of the project, field procedures, laboratory procedures, difficulties encountered and will include validated final laboratory reports (with copies of chain of custody records) as appendices. All documentation will be recorded in accordance with standard operating procedures.

11.0 SAMPLE PACKING, SHIPPING, AND DOCUMENTATION

The asbestos samples will be sent under chain of custody to the laboratory for analysis. Scribe will be used for sample management as well as generation of sample labels and chain of custody (COC) records. COC records will be used to document the collection of all air samples. All COC records will receive a peer review in the field prior to shipment of the samples in accordance SOPs. At least two custody seals will be placed across the canister shipping containers to ensure sample integrity.

Cooler Preparation
In preparation for sample shipment:

- Plastic coolers, or similar, will be used for each sample shipment;
- Coolers shall be inspected prior to shipment for cleanliness;
- All cooler drain plugs will be sealed with tape;
- All previous shipping labels will be removed.

Packing Samples in Coolers
Each sample will be placed in an individual paper envelope

Closing and Shipping of Coolers
Sample documentation will be enclosed in sealed plastic bags taped to the underside of the cooler lid. Coolers will be secured with packing tape and custody seals as described below:

- Cooler lids will be taped shut with strapping tape, encircling the cooler several times;
- Chain of custody seals will be placed on two sides of the lid after closing the lid (one in front and one on the side);
- "This Side Up" arrows will be placed on the sides of the cooler; and
- Coolers will then be shipped to the laboratory by overnight courier as soon as possible.

Daily shipments are required to obtain 24-hour turn around required for the N-Forcer site.

12.0 REFERENCES

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TABLE 1. Field Sampling Summary - Air
N-Former Asbestos Site
Dearborn, City, State MI

Analytical Parameter	Sampling Media	Suggested Holding Times	Flow Rate	Volume Min - Max	Subtotal Number Samples
TEM Asbestos ISO 10312 (Area/Perimeter/Fence line/Residential)	0.45 or 0.8 µm 25 mm MCE Filter	30 Days	10 L/min	4200 L	20
PCM Asbestos NIOSH 7400 (Personnel & perimeter sampling)	0.45 or 0.8 µm 25 mm MCE Filter	30 Days	1-5 L/min (personnel) ~10 L/min (perimeter)	480 L (personnel) 4200 (perimeter)	100

µm = micrometer
L = liter
L/min = liters per minute
N/A = not applicable
ISO = International Organization of Standardization
TEM = Transmission Electron Microscopy
NIOSH = National Institute of Occupational Safety and Health
mm = millimeter
MCE = mixed cellulose ester

TABLE 2. QA/QC Analysis and Data Categories Summary - Air

W.R. Grace Asbestos Site

Dearborn City, State MT

Analytical Parameter	Analytical Method	Estimated Limit of Detection[1]	Lot Blanks[2]	Field Blanks[3]	Collocated Samples[4]	Trip Blanks[5]	Breakthrough	PE Samples	Data Category
TEM Asbestos ISO 10312 (Perimeter)	TEM Asbestos ISO 10312	***0.0005 f/cc***	1 per lot used	1 per day sampled	1 per sampling event	N/A	N/A	1	DD
PCM Asbestos NIOSH 7400 (Workers)	PCM Asbestos NIOSH 7400	***0.001 f/cc***	1 per lot used	1 per day sampled	1 per sampling event	N/A	N/A	N/A	DD

DD= Definitive Data

1. To be determined by the person arranging the analysis. Should be equal to or less than the action level.
2. Required for all data categories at a minimum rate of 10 percent of the total sample or one per sampling event per lot.
3. Mandatory for Definitive Data at a minimum rate of 5 percent of the total sample or one per sampling event. Certain methods may require a greater frequency.
4. Required for all data categories at a minimum rate of 5 percent of the total sample or one per sampling event.
5. Optional for SD/DC and mandatory for DD at a minimum rate of 5 percent of the total sample or one per sampling event.

f/cc = fibers per cubic centimeter
mg/m^3 = milligrams per cubic meter
N/A = not applicable
ISO = International Organization of Standardization
TEM = Transmission Electron Microscopy
NIOSH = National Institute of Occupational Safety and Health
PE = Performance Evaluation
QC = Quality Control